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BEFORE THE
FEDERAL COMMUNICATIONS COMMISSION
WASHINGTON, D.C. 20554

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FEDERAL COMMUNICATIONS COMMISSION
OFFICE OF THE SECRETARY

In the Matter of

AMENDMENT OF PARTS 2 AND 15 OF THE
COMMISSION'S RULES TO FURTHER ENSURE
THAT SCANNING RECEIVERS DO NOT
RECEIVE CELLULAR RADIO SIGNALS

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ET DOCKET No. 98-76
RM-9022

To: The Commission

COMMENTS OF YAESU MUSEN CO., LTD.

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SUMMARY

Yaesu Musen Co., Ltd. and its subsidiary Yaesu USA, a manufacturer of communications equipment used by licensed Amateur Radio Operators and Short-Wave Listeners, herein comment on the *Notice of Proposed Rule Making* in ET Docket 98-76. The NPRM proposes to amend Parts 2 and 15 of the Rules to “ensure” the privacy of Cellular-telephone conversations.

Practically speaking, that attempt would be in vain, as there never has been any such privacy, there is none now, and there never will be, especially for conventional analog Cellular (AMPS) transmissions. There are simply too many Cellular-capable analog FM receivers already in circulation. Moreover, the proposed rule amendments would place onerous burdens on the manufacturers of scanning receivers, but would not ensure Cellular privacy, even in receivers redesigned to comply with the NPRM’s technical proposals.

And legally speaking, in light of the very real, utter lack of Cellular privacy, there is no substantial evidence — or even a rational basis — to justify those onerous burdens. Also legally speaking, the proposed rule amendments are Constitutionally infirm, as they seek to inhibit the First-Amendment rights of the people to access, for wholly legitimate purposes, a significant block of the publicly-owned airwaves. There are less restrictive means available for the creation of some degree of privacy of telephone conversations that employ radio-frequency links. The First Amendment requires the Commission to employ such less restrictive means.

The FCC should therefore terminate this proceeding without adopting any of the NPRM’s proposals.

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To: The Commission

COMMENTS

Yaesu Musen Co., Ltd. and its domestic subsidiary Yaesu USA (collectively *Yaesu*), a manufacturer of commercial and Amateur Radio transceivers and communications receivers, hereby comment on the Notice of Proposed Rule Making (NPRM), 63 Fed. Reg. 31684 (June 10, 1998) in this proceeding.

I. BACKGROUND

A. THE PROCEEDING

1. The NPRM proposes, for the stated goal of "ensuring" the privacy of Cellular telephone communications, to impose:

- (a) substantially more rigorous technical requirements on scanning receivers; and also
- (b) substantial economic burdens on their manufacturers and their purchasers.

As Yaesu will show, the proposed course of action is ill-founded.

B. YAESU AND ITS INTEREST IN THE PROCEEDING

2. Yaesu is a manufacturer of high-quality radio transceivers used by licensed Amateur and Commercial Radio Operators in the United States and around the world. Yaesu Musen also makes high-quality Short-Wave receivers used by ordinary citizens in many countries for news and entertainment. Yaesu, a preeminent manufacturer in these fields, has been in business for decades, and deservedly enjoys an excellent reputation for its products' thoughtful designs, durability, performance, and cost effectiveness. Certain of Yaesu's products, including Amateur-Radio transceivers, include a scanning function in the receive mode. Therefore, any rule changes flowing from this Docket could require the redesign of both existing Yaesu products and future products, including some already well along in the design stage. Moreover, the proposed changes could render illegal and worthless stock in inventory. Therefore, Yaesu is well positioned to offer Comments and has standing to participate in this proceeding.

C. THE CURRENT FCC RULES AND STATUTES

3. The Report and Order in ET Docket 93-1, 8 FCC Rcd 2911 (1993)(the *Order*), recons. den., 75 Rad. Reg. (P & F) 2d 982 (1994) (the *Reconsideration Order*), promulgated §§ 15.37(f) and 15.121 of the Rules. The Commission adopted those regulations at the direction of Congress. See the Telephone Disclosure and Dispute Resolution Act (the *TDDRA*), P.L. 102-556. The TDDRA amended § 302(d) of the Communications Act (the *Act*) and ordered the FCC to deny equipment authorization for any scanning receiver that could: (a) receive transmissions

in the Cellular Telephone bands (824-849 and 869-894 MHz); (b) readily be altered by the user to receive transmissions in such bands, or (c) be equipped with decoders that convert digital cellular transmissions to analog voice audio. The TDDRA also mandated a one-year cut-off, running from the effective date of the adopted regulations, for the domestic manufacture and the importation of noncompliant receivers.

4. As adopted in ET Docket 93-1, Section 15.121(a) reads as follows

(a) Except as provided in paragraph (b) of this Section, scanning receivers, or frequency converters designed or marketed for use with scanning receivers, must be incapable of operating (tuning), or readily being altered by the user to operate, within the [Cellular] bands.... Receivers capable of "readily being altered by the user" include but are not limited to, those for which the ability to receive transmissions in the cellular telephone bands can be added by clipping the leads of, or installing, a simple component such as a diode, resistor, and/or jumper wire; replacing a plug-in semiconductor chip; or programming a semiconductor chip using special access codes or an external device, such as a personal computer. Scanning receivers, and frequency converters designed or marketed for use with scanning receivers must be incapable of converting digital cellular transmissions to analog voice audio.

Subsection (b) exempts scanning receivers and frequency converters for use with scanning receivers that are exclusively manufactured for and marketed to Cellular service providers. ET Docket 93-1 also promulgated § 15.37(b) to ban the further manufacture, importation, and marketing of noncompliant scanning receivers as of April 26, 1994.

5. Although neither the TDDRA nor Section 302(d) of the Act defines a scanning receiver, § 15.3(v) of the Rules defines one as a receiver that automatically switches among four or more frequencies in the range of 30 to 900 MHz and which is capable of stopping at and receiving a radio signal detected on a frequency. Section 15.3(v) goes on to exempt from the definition scanners designed solely for the reception of Part 73 broadcast signals "or for

operation as part of a licensed station....”

D. THE NPRM’S SPECIFIC PROPOSALS

6. The NPRM proposes to amend Parts 2 and 15 of the rules “to ensure the privacy of communications in Cellular Service.” *Id.* at para. 1. Among the NPRM’s specific proposals are:

- a. at the suggestion of Uniden Corporation, a manufacturer of scanners and thus a competitor of Yaesu, to require scanning receivers to exhibit a response to signals on “image” frequencies of -38 dB relative to the response to a signal on the tuned-in frequency;
- b. to require that scanning receivers be designed so that tuning and control circuits are inaccessible, and so that any attempt to modify the receiver to tune Cellular bands will likely render the device inoperable. Among the approaches the NPRM weighs are requiring the encasing of tuning and control circuits in epoxy or irremovable metal enclosures;
- c. to require any application for certification of a scanning receiver to include additional information demonstrating compliance with the proposed required image response, assessing the vulnerability of the receiver to modification, and describing the design features that prevent modification for Cellular reception; and
- d. to possibly expand the definition of scanning receivers to include manually tuned models; and
- e. to make the new rules effective 90 days from the date of publication in the Federal Register of any Report and Order adopted as a result of the NPRM.

II. GENERAL COMMENTS

7. Yaesu is a responsible, law-abiding corporate entity. Yaesu neither encourages nor condones modifications to its products. In view of the compact size of many of Yaesu’s products, the resulting high circuit-board density, and the miniaturization and sensitivity to heat

and static electricity of solid-state components used in Yaesu's products, modifications to Yaesu products are ill-advised. The owner's manual supplied with each Yaesu product unequivocally states that any modifications void the factory warranty, could adversely affect proper operation, and should not be undertaken.

8. Also, Yaesu is not insensitive to — *rather Yaesu sincerely understands* — the desire of many, if not all, Cellular users to conduct their mobile communications in “private.” However, that desire, while perfectly understandable, flies in the face of hard reality and the First-Amendment rights of the American people at large.

9. Yaesu respectfully submits that the Commission's stated goal is, for better or worse, already beyond reach. Indeed, it has always been beyond reach. The proposed rule changes will not “ensure” the privacy of Cellular communications. Such communications lack any real privacy to begin with, always have, and will continue to lack privacy so long as they are in unencrypted, analog form.

10. The proposed changes are also, at best, of dubious legal merit. Principally, they are constitutionally suspect. Moreover, from a technical perspective, they are flawed. One of the principal proposed rule changes (a required substantial “image rejection”), if adopted, will be in vain. In minutes, anyone with the slightest inclination, using off-the shelf equipment, could nullify this major additional “safeguard” that the Commission would impose on manufacturers of scanning receivers. Another of the additional “safeguards” (a required permanent sealing of tuning and control circuits) poses significant economic risk to the public at large which purchases scanners, as well as the risk of significant environmental harm.

11. All in all, the proposed rule changes would impose substantial burdens on manufacturers and consumers, for no real benefit. If the FCC is interested in really fostering privacy of Cellular communications, it will place the burden where it properly belongs — on the manufacturers of Cellular telephones, to incorporate encryption into their designs, and to educate the public through warning labels on their products about the degree to which users' transmissions may be overheard, just as the FCC already requires for cordless phones.

**A. THE PROPOSALS REPRESENT IMPERMISSIBLE RESTRAINTS ON THE PUBLIC AT LARGE
UNDER THE FIRST AMENDMENT TO THE CONSTITUTION OF THE UNITED STATES**

12. The FCC seeks to ensure something that is truly uninsurable by trying to place 50 MHz of radio-frequency spectrum off limits to the American people. This approach is at odds with the very cornerstone of the FCC's power to regulate the use of the electromagnetic spectrum — *the notion that the airwaves are not private property, but rather they belong to the people at large.*

13. The primary use of the electromagnetic spectrum is to convey information from one place to another; to communicate. The very origins of this country lay in the communication of ideas and concepts. The public's right to convey and to receive information is one of our most cherished rights, enshrined in the First Amendment. Indeed, the Supreme Court has stated in the plainest of terms that the First Amendment protects not just the speaker's right to speak, or the publisher's right to publish, but also the public's right to listen and to receive information. Reno

v. ACLU, 117 S.Ct. 2329, 138 L.Ed.2d 874 (1997).¹

14. Reno dealt with Title V of the Telecommunications Act of 1996, Pub. L. 104–104, 110 Stat. 56, better known as the Communications Decency Act (the *CDA*). The CDA attempted to restrain the dissemination through the Internet of material deemed indecent or patently offensive. The Court struck down the CDA on several grounds, among them:

- that although the Government has an interest in protecting children from potentially harmful materials (e.g., Ginsberg v. New York, 390 U. S. 629, 639), the CDA tried to do so by suppressing a large amount of speech that adults have a constitutional right to send and receive (e.g., Sable Communications of Cal., Inc. v. FCC, 492 U.S. 115, 126); and
- that the CDA's burden on adult speech was unacceptable because the Government had not proven that less restrictive alternatives would be at least as effective in achieving the Act's legitimate purposes (e.g., Sable, at 126).

Just so here, the proposed rules — indeed, even the existing ones — while geared to a different goal (to “ensure” the ostensible “privacy” of Cellular calls), suffer from the same infirmity.

15. A ban on certain receivers, scanning or otherwise, that can respond to signals in a given radio-frequency band denies to a segment of the population² ready access to those

¹Reno held, *inter alia*, that although the Government has an interest in protecting children from potentially harmful materials, see, e.g., Ginsberg, 390 U. S., at 639, the CDA pursued that interest by suppressing a large amount of speech that adults have a constitutional right to send and receive, see, e.g., Sable, *supra*, at 126, and that the CDA's burden on adult speech is unacceptable if less restrictive alternatives would be at least as effective in achieving the Act's legitimate purposes, e.g., Sable, 492 U. S., at 126.

²That is, those who do not have an older television receiver, which quite handily tunes the Cellular bands, those who did not purchase one of the myriad of scanners sold from the advent of the technology before April 27, 1994, those who have not purchased a used scanner since, and those who do not purchase a scanner made or imported prior to any effective date of the proposed rules, assuming for the sake of argument that the Commission adopts them.

frequencies (which belong to them) and to information those channels may convey. This raises the most serious of questions under the First Amendment to the Constitution. Reno, supra. Of course, First Amendment rights are not unlimited. For example, no one has a Constitutional right to speak or to listen for a criminal purpose. But tuning a receiver, manually or automatically, in the Cellular or any other band segments, can have perfectly legitimate purposes.

- For example, radio transmitters sometimes generate unintended spurious products through intermodulation or other means. The transmission of such spurious energy at certain levels can violate the Act and FCC rules, and can subject the transmitter's user to serious legal sanctions — even if the user does not know that such spurious transmissions are occurring.³ True, one can use a piece of test equipment such as a spectrum analyzer to check a transmitter's spectral purity, but such test gear is sophisticated, expensive, and beyond the means of many people, including many licensed radio amateurs — Yaesu's customers among them. A scanning receiver provides a quick and inexpensive but very reliable means of checking for spurious components. Yet the proposed rules would undercut the ability of amateurs to police themselves by reducing the ability of scanning receivers to pick up spurious products within the Cellular bands. Especially in light of vigorous enforcement actions to curtail interfering and illegal transmissions, the irony of this is inescapable.
- Another legitimate use of scanning receivers in the Cellular (and many other) band segments is completely lawful, unlicensed communications under Part 15 of the rules. Many hobbyists and others employ Part 15 for communications and for experimentation with communications technologies over short distances. Operations under Part 15 are on a noninterference basis. 47 C.F.R. § 15.5. To curtail potential interference to licensed communications, Part 15 generally restricts transmitters to very low output levels. 47 C.F.R. § 15.209. To further curtail interference potential in certain critical bands, Part 15 transmitters may not radiate any fundamental energy in those bands, only spurious energy, which is generally substantially weaker than the already low Part 15 fundamental levels. 47 C.F.R. § 15.205. The Cellular band segments are *not* among those “forbidden bands.” *Id.* And precisely because signal levels are so low, receiver response is of paramount importance to such perfectly legitimate activity.

³Intent, or even awareness that a violation is occurring, is not a prerequisite to the imposition of a sanction. E.g., *Southern California Broadcasting Co.*, 6 FCC Rcd 4387 (1991).

16. The NPRM itself acknowledges that merely listening to Cellular communications does not in and of itself violate the Act. NPRM at para. 19. Rather, to violate Section 705, one must receive a non-exempt radio communication and either divulge to some third person or make beneficial use of the contents of that communication. Id.

17. The NPRM, at para. 19, points out that the Electronic Communications Privacy Act of 1986⁴ prohibits the “intentional interception of Cellular {conversations and that}.... [m]any states also have statutes in this area.” As the Illinois State Bar Association has observed, in ISBA Advisory Opinion on Professional Conduct No. 96-10 (May 16, 1997),

“The [ECPA] is the federal codification of the intrusion arm of the common law tort of invasion of privacy applied to electronic communication and provides criminal and civil penalties for its violation.”⁵

Under the common law of torts, it is axiomatic that no invasion of privacy takes place on public property.

“On the public street, or in any other public place, the plaintiff has no legal right to be alone; and it is no invasion of his privacy than to do no more than follow him about and

⁴Pub. L. 99-508, Oct. 21, 1986, 100 Stat. 1848 (18 U.S.C. §§ 1367, 2232, 2510 et seq., 2701 et seq., 3117, 3121 et seq.

⁵In discussing the propriety of lawyers’ use of electronic mail services to transmit client-confidential information, ISBA Opinion No. 96-10 also correctly observes:

Unlike a cordless cellular telephone message, for example, an Internet e-mail is not broadcast over the open air waves, but [rather] through ordinary telephone lines and the intermediate computers. When an Internet message is transmitted over an ordinary telephone line, it is subject to the same protections and difficulties of interception as an ordinary [i.e., wired] telephone call. To intercept an Internet communication while it is in transit over [wired] telephone lines requires an illegal wiretap.

watch [or listen] to him there.”

W. PROSSER, LAW OF TORTS, § 112 AT 834 (3rd ed. 1964). Consistent with this fundamental common-law tenet, 18 U.S.C. § 2511(g)(1)(i) — part of the ECPA — states:

“It shall not be unlawful under this chapter or chapter 121 of this title for any person to intercept or access an electronic communication made through an electronic communication system that is configured so that such electronic communication is readily accessible to the general public.”

As shown below, conversations carried out using unencrypted, analog Cellular telephones *are* readily accessible to the general public. Also, someone may overhear a Cellular conversation without intentionally setting out to do so. And as pointed out above, there are legitimate reasons for tuning a receiver in the Cellular bands that have nothing to do with a desire or an intent to engage in Cellular eavesdropping. There is thus no tension between the ECPA, particularly 18 U.S.C. § 2511(g)(1)(i), and the public’s unrestricted right to receive signals within the Cellular band segments. To attempt to construe the ECPA otherwise, to completely wall off the Cellular band segments from the public’s benign uses, raises the gravest of Constitutional issues.⁶

18. Prior to their allocation for Cellular use, the frequencies in question were allocated for Broadcast Television use, specifically, for uhf Television Channels 73-77 and 80-83.

HOWARD W. SAMS & CO., INC., REFERENCE DATA FOR RADIO ENGINEERS (6th ed. 1975) at p.

⁶It appears that the Supreme Court has never had occasion to pass on the constitutionality of such a construction of the ECPA. Indeed, under *Reno*’s rationale, to the extent that the ECPA would deprive the public of legitimate communications uses of the public airwaves, such a construction is extremely suspect. It is not permissible, in the context of the First Amendment, to “burn the house to roast the pig.” *Reno*, quoting *Sable*, 492 U.S. at 127.

30-10. Under the All-Channel Receiver Act,⁷ all television receivers manufactured or marketed in the United States had to tune those frequencies. Before the Commission mandated detented tuning for uhf channels if vhf channels were also detented,⁸ most television receivers tuned continuously across the uhf band. The reallocation of the channels in question did not end the utility of television receivers that could tune above Channel 69. The sound component of (NTSC) Broadcast Television programming is transmitted by analog frequency modulation. Conventional Cellular broadcasts are also transmitted via analog frequency modulation.

19. After the FCC reallocated Channels 70-83 for land-mobile use, and up until April 26, 1994, large numbers of scanning receivers capable of tuning the Cellular bands and equipped to detect analog frequency modulation were sold. Because these scanners are of solid-state construction, they have long useful lifetimes, and the vast majority are likely still in service. Furthermore, as the NPRM acknowledges, cellular phones themselves can be handily turned into cellular receivers through the use of keypad or software-accessible "test modes."⁹ Therefore, for all the time that analog Cellular telephones have been in service, large numbers of receivers capable of receiving analog Cellular transmissions have also been in the hands of the public. In other words, the horse was out of the barn before the barn was ever built, and the horse has never

⁷Pub. L. 87-529, July 10, 1962, 76 Stat. 150, 47 U.S.C. § 303(s).

⁸See 47 C.F.R. § 15.117(c).

⁹These readily accessible functions are not necessary to the essential functioning of the phones themselves. Rather, the phones carry these features to make life easier for the Cellular service providers and the providers of phone-repair services.

been in the barn since the barn was built.

20. The April 1997 issue of *Mobile Computing Communications* put it this way:

"Omnipoint Communications Inc., a Mountain Lakes, NJ, company that recently has begun providing PCS wireless phone service in the metropolitan New York area, took the occasion of the leak [involving House Speaker Gingrich's use of an analog Cellular phone] to remind people how easy it is to eavesdrop on a regular analog cellular call. The company was of course quick to point out how hard it is to do the same on a PCS phone conversation.

"According to Kevin Murray, a counterespionage consultant based in Clinton, NJ, eavesdropping has been more the rule than the exception. A survey even as far back as 1988 revealed that 1 million people in the United States owned police scanners capable of eavesdropping on cellular transmissions. The number has surely grown since then. The listening audience, in fact, is large enough to support no less than three magazines dedicated to the subject of scanning. "It is no longer a question of if someone is listening," says Murray, "but how many."

"Murray maintains that most of the eavesdropping is benign and is done by hobbyists listening in to police calls the way they might watch "Cops" on television. But some people are recording the information and selling it. To combat the problem, Congress passed a law prohibiting eavesdropping. Murray calls the law "a nice thought," but notes that eavesdropping is difficult to prove, making the legislation practically impossible to enforce. And although Congress also passed a law banning the manufacture of scanners capable of eavesdropping on cellular calls, these devices are still available outside the United States. 'You can buy one at a RadioShack in England or Canada,' says Murray, "and they can FedEx it to you the next day.'"

The magazine went on to offer the following, "Cellular Privacy Tips:

"Assume that someone is always listening.

"Be as vague and uninteresting as possible.

"Use first names only.

"Invent code words for sensitive topics.

"Do not use company names.

"Remind the other person that you are speaking on a cellular phone.

"Alert others to the security threats inherent in cellular transmission.

"Manually shift dual-mode digital cellular phones to digital only (where available).

"Consider adding encryption or switching to an encrypted wireless phone technology.

“Source: Murray and Associates, Mobile Computing & Communications.”

21. The January 11, 1997 edition of a Georgia newspaper, *The Augusta Chronicle*, quoted Mr. Julius Knapp, Chief of OET’s Policy and Rules Division, as describing the plethora of Cellular-capable scanners produced before April 26, 1994 in the following terms:

“They were produced for years,” Mr. Knapp said. “Many of them are still out there.”

The Augusta Chronicle also, accurately, described the privacy situation as follows:

“Most cell systems use analog technology - radio waves - that are easy to intercept.

“Digital technology, now just beginning, is harder to intercept because it breaks the cellular signal into small bits of information, transmits the pieces separately and reassembles them upon reception. There are many combinations for breaking up and reassembling the bits.

“If those options don’t appeal, communications experts suggest using a regular, wired telephone.”

22. The *Privacy Rights Clearing House*, in its *Fact Sheet No. 2*, states:

Currently there is no inexpensive way to ensure privacy on either cordless or cellular phone calls. If you are discussing a private matter or you simply do not want others to listen to your call, it is best to switch to a standard “wire” telephone. Be sure both you and the person you are talking to are on standard phones.

See <http://www.vortex.com/privacy/prc.cord-2.Z>. These are just a sampling of the many observations that various persons (with no vested interests) have made concerning the lack of analog Cellular privacy.

23. Over the years, many Courts have also observed that there is in fact little if any real privacy when talking over an analog wireless telephone. Many of these cases have arisen

under the Fourth Amendment, in connection with putting into evidence the substance of overheard mobile- or cordless-telephone conversations. In Fourth-Amendment analyses, a key area of enquiry is whether the person alleging an unlawful degree of scrutiny had a reasonable expectation of privacy. In the context of analog wireless conversations, the answer is overwhelmingly *no*. See, e.g., McKamey v. Roach, 55 F. 3d 1236 (6th Cir. 1995); Edwards v. State Farm Insurance Co., 833 F. 2d 535 (5th Cir. 1987); U.S. v. Hoffa, 436 F. 2d 1243 (7th Cir., 1970), cert. den., 400 U.S. 1000; U.S. v. Sugden, 226 F.2d 281 (9th Cir., 1955), aff'd, 351 U.S. 916; Dorsey v. State, 402 So. 2d 1178 (Fla., 1981), and many others.¹⁰ This is completely consistent with the Supreme Court's analogous holding in California v. Greenwood, 486 U.S. 35 (1988), in which the Court found no legally protectable expectation of privacy for information left on the public streets, where such data were "... readily accessible to animals, children, scavengers, snoops, and other members of the public."

24. Clearly, the FCC cannot, in the name of ensuring a never-existent and uninsurable privacy, abridge the First Amendment rights of the public to access open radio channels and in-the-clear information. Assuming *arguendo* that the FCC (or the Congress) has a legitimate interest in helping Cellular subscribers avoid loss of face (or other losses) stemming from the lack of privacy of Cellular communications, there are less restrictive means available. The first is for the FCC to ensure that the public knows that cellular communications *are really not private*. The

¹⁰While certain state Courts have reached a different result, e.g., State v. Smith, 142 Wis. 2d 562, 419 NW 2d 259 (Wisc. App. 1987), Mozo v. State, 632 So. 2d 623, 19 FLW D 141 (Fla. App D4, 1994), they have done so construing state statutes or state constitutions, which are inapposite in the Federal context.

FCC has seen fit to force manufacturers of cordless phones to inform the public, via labels on the phones, that “[p]rivacy of communications may not be ensured when using this phone.” 47

C.F.R. § 15.214(c).¹¹ In pointed contrast, the FCC has never required similar labelling on Cellular phones, especially analog Cellular phones, despite their substantially higher vulnerability to reception by third parties. It is past time to require such public advisories.

25. The FCC can also encourage Cellular licensees to convert to digital and encrypted transmission formats, rather than relying on the decades-old *AMPS* in-the-clear, analog, narrowband-FM format. Or, just as it has sunsetted and is sunsetting other outmoded (and spectrally inefficient) transmission formats, the FCC can sunset *AMPS* and require that Cellular phones include voice-scrambling technology, or a less pedestrian modulation scheme than *AMPS*, or both. And finally, the Commission can let the powerful hand of marketplace forces resolve the situation, as it has in so many other contexts, and as it is doing in this one. Wireless service providers are shifting to digital transmission formats for substantially greater spectral efficiency. Moreover, those carriers who offer digital formats extol the enhanced privacy of their systems. Those Cellular subscribers who want real privacy will insist on phones with digital formats, or robust encryption, or both. Those who do not want greater privacy can use analog phones, so

¹¹Even while recognizing that “[c]onsumers must bear some responsibility for evaluating the advantages and disadvantages of cordless phones before deciding whether to purchase such a device [and even though t]he lack of privacy when using cordless phones has been discussed in any number of consumer magazines...., the FCC still felt “... that this information is of sufficient importance that it should be put on the equipment where it might be seen by anyone who might use the cordless phone.” Report and Order in Gen. Docket 83-325, 49 Fed.Reg. 1512 (1984) at paras. 33-35

long as their service providers continue to support the AMPS format.¹²

26. Before we leave the First Amendment issue, consider this analogy. Two people talking on a public-park bench have no cause to complain if another, sitting on the next bench over, passing the time of day, hears what the conversants would prefer to keep private. If the conversants want privacy, it is up to them to move to private quarters, and it is not for them to have a police officer arrest the third person for overhearing the conversation, or force the third person to move so the parties can talk “in private.”

27. So it is with the public airwaves. Some people listen to the public airwaves as a harmless hobby. Some people monitor the public airwaves for scientific or educational reasons. Others see scanning as a form of public service, a way to provide law-enforcement officers with evidence, gathered from a public vantage point, of criminal conduct conducted in the open,¹³ or to help people in need of roadside, or medical, or public-safety assistance.

III. COMMENTS ON THE NPRM’S SPECIFIC PROPOSALS

A. IMAGE RESPONSE

28. The NPRM proposes that scanning receivers display a -38 dB image response across the Cellular band segments. This is at the suggestion of the Uniden Corporation.

¹²The trend in the market is clearly toward digital Cellular and to PCS, whose signals are nowhere nearly as vulnerable to third-party reception and divulgence or beneficial use as are analog Cellular. Thus, the “problem” is rapidly being resolved through the replacement of a largely outmoded and less-spectrally-efficient technology.

¹³ See, e.g., Edwards, *supra*; U.S. v. Hall, 488 F.2d 193 (9th Cir. 1955), in which private citizens heard what were clearly criminal activities and reported the crimes to the police.

Currently, there is absolutely no FCC requirement as regards image response, and the exact value varies from unit to unit. The adoption of a -38-dB image response is supposed to ensure Cellular privacy by making it less likely that a scanner tuned to a non-Cellular frequency will reproduce the contents of a Cellular transmission. However, as the NPRM admits, Uniden has provided absolutely no basis for its proposed -38-dB standard.

29. The FCC cannot adopt a rule that lacks a foundation of "... reliable, probative, and substantial evidence." 5 U.S.C. § 556(d).

[S]ubstantial evidence is more than a mere scintilla. It means such relevant evidence as a reasonable mind might accept as adequate to support a conclusion." *Consolidated Edison Co. v. Labor Board*, 305 U.S. 197, 229. Accordingly, it "must do more than create a suspicion of the existence of the fact to be established. . . . it must be enough to justify, if the trial were to a jury, a refusal to direct a verdict when the conclusion sought to be drawn from it is one of fact for the jury." *Labor Board v. Columbian Enameling & Stamping Co.*, 306 U.S. 292, 300.

Universal Camera Corp. v. National Labor Relations Board, 340 U.S. 474 (1951). Here, even a "mere scintilla" is lacking. Therefore, the Commission cannot adopt the proposed standard on the record as it now stands.

30. Moreover, assuming *arguendo* that mandating a -38-dB image response across the Cellular band would make scanners less responsive to in-band signals, and that such is Constitutionally permissible, it would be incredibly easy for anyone with the slightest desire to completely undercut the added FCC requirement. Let us suppose that a given scanning receiver, as currently produced, has an in-band image response of 0 dB, meaning that it responds equally to Cellular signals on image frequencies as it would to a signal on a frequency outside the Cellular band to which the receiver is tuned. Adding 38 dB of suppression at the image frequency would

mean that, to receive a signal on the Cellular image frequency with the same facility as in the original design, the r-f input signal would have to be 38 dB stronger than it originally was.

31. Providing more r-f drive to the modified receiver is simple. One can do this:

- by using a more efficient receiving antenna; or
- by using a more efficient transmission line;
- by using a preamplifier with gain in the Cellular band; or
- through some combination of any two or all three of the above.

32. Typical uhf corner reflectors designed for Broadcast Television reception, readily available at modest cost, have gains of about 10 dB. REFERENCE DATA FOR RADIO ENGINEERS AT 25-51; 1997 RADIO SHACK CATALOG AT 135. Simple but effective arrays of stacked vertical dipoles or collinear arrays can be made from scratch using aluminum tubing and other commonplace materials. Such antennas are compact at uhf frequencies and offer gains of 6 to 9 dB. Plans are widely available, e.g., THE AMERICAN RADIO RELAY LEAGUE, THE ARRL ANTENNA BOOK (13th ed., 1975), at 246-249, as are modestly-priced commercial products.

33. Switching from lossy RG-58A/U or RG-58/U coaxial receiving transmission line to more efficient RG-8 foam-dielectric coax, or from RG-58/U or RG-8 to half-inch 50-ohm "hard line" can increase r.f. input to the scanner anywhere from 2 to 13 dB (assuming a 100-foot length). THE AMERICAN RADIO RELAY LEAGUE, THE ARRL HANDBOOK FOR RADIO AMATEURS (71st ed., 1994), at p. 16-14, Fig. 23.

34. Readily available preamplifiers, also designed for Broadcast Television reception, are also priced modestly and offer gains in the range of 15 to 30 dB. E.g., 1997 RADIO SHACK

CATALOG AT 139.¹⁴ Noise figures are typically just 3 to 4 dB. E.g., <http://www.winegard.com/ampspec1.html>. These and other readily available preamplifiers are primarily designed for uhf television use. That means they are inherently broadband devices. The top of the Cellular band is just 11% removed from the top of Channel 69 — much less than one octave. For a preamplifier that must provide essentially flat gain from the bottom of Channel 14 (470 MHz) up to at least the top of Channel 69 (806 MHz), an additional 88 MHz (to 894 MHz) is largely insignificant. Actual gain at Cellular frequencies must be very close to the published gain figures for Channels 14-69. Moreover, one can cascade any two of these preamplifiers with the resulting overall gain equal to the sum of the two's individual gains.¹⁵ Recapturing 38 dB of signal strength at Cellular frequencies would be child's play for those who want to do so.

35. Moreover, in many cases, manufacturers (including Yaesu) would have to radically modify their existing products to achieve a -38-dB image-response specification. Substantially enhancing image response in a receiver requires one or more of the following design changes:

- significantly increasing the “first i-f” (intermediate frequency) so as to place the image further away from the desired signal;
- adding a notch filter at or near the r.f. input to suppress a particular range of frequencies;

¹⁴Radio Shack and others also sell amplified antennas for indoor, outdoor, and mobile use, with preamplifier gains billed at 20 dB. E.g., 1997 RADIO SHACK CATALOG AT 135.

¹⁵The only practical problem one might run in to in cascading high-gain preamps is signal overload from, say, a nearby uhf Broadcast Television station. But one can readily deal with that through the use of a notch filter. Anyone can make one from inexpensive parts, or even from a trio of inexpensive coaxial connectors and a scrap of coaxial transmission line a few inches long (a quarter-wavelength, open-circuited stub), using widely available plans. Modestly priced notch filters and tuneable signal attenuators are also commercially available.

- greatly improving the selectivity of one or more of the i-f stages through the use of filters with much sharper skirts, or the use of cascaded filters.

The first alternative would require major changes to the local oscillator, mixer, and the first i-f amplifier sections. The second is easily defeatable by those with the motivation to alter the products they purchase. The third would require major changes to the i-f sections that would drive up costs substantially.

36. The situation becomes more difficult in the case of a transceiver, where transmit and receive functions may employ the same circuit at different times, and where circuit-board real estate is at much more of a premium. Changes to common-mode sections of a transceiver to achieve a different performance specification on receive can have a ripple effect to require additional changes in transmit sections of the composite device. Yaesu, as a transceiver manufacturer, and radio amateurs who buy its transceivers, would be particularly affected by this phenomenon, whereas a company that mainly or entirely makes receivers only would not. A -38-dB image response requirement would require extensive redesign of current and soon-to-be introduced Yaesu products.

37. Even putting aside — for the moment, at least — the points Yaesu has already made, Uniden's suggested -38-dB image response requirement wouldn't really do anything to "ensure" Cellular privacy. Rather, it would be pure window dressing. Here's why:

- A typical scanning receiver has a sensitivity rating of $0.15 \mu\text{V}$ for a 12-dB SINAD (Signal to Noise and Distortion) ratio. A 12-dB SINAD corresponds to a level at which the signal is sufficiently elevated above background noise and distortion to provide for comfortable, intelligible listening. It is a level that any radio hobbyist would consider

more than adequate for reception purposes.¹⁶

- An input signal voltage of 0.15 μ V corresponds to a signal power of -123.5 dBm.
- To compensate for signal fading and to provide for consistent, reliable communications, standard Cellular-engineering practices call for a minimum acceptable signal power into the receiver of -85 dBm¹⁷, and Cellular systems strive to provide -70 to -65 dBm, to provide for an even greater margin of reliability.
- If we take -85 dBm, the minimum level which Cellular systems seek to provide, and factor in (i.e., subtract) the -38 dB proposed required image-rejection, we arrive at... *-123 dBm!* That is 0.5 dB greater signal than needed for minimum useable sensitivity.

So in other words, a contemporary scanner with a -38 dB image response in the Cellular band will still get enough drive on Cellular frequencies, in Cellular service areas, to provide a comfortably listenable rendition of Cellular conversations, when tuned to the corresponding image frequencies! In those areas where Cellular signals are 15 to 20 dB higher than the -85-dBm service floor, as Cellular carriers strive to achieve, reception of Cellular signals will be that much better. Requiring a -38-dB image response will thus do nothing to “ensure the privacy” of Cellular calls in and around Cellular service areas.

B. SEALING OF TUNING AND CONTROL CIRCUITS

38. This proposal, too, is misguided. The NPRM proposes to require scanner manufacturers to wall off “tuning and control circuitry” using, for example, epoxy or metal compartments to make them “completely inaccessible” and such that any attempt to access the

¹⁶Proposed § 15.121(a)(2) states that “... a measured signal-to-noise ratio of 12 dB... is considered the threshold where a signal can be clearly discerned....”

¹⁷0 dBm = 1 milliWatt of signal power.

isolated components to modify the equipment to receive Cellular transmissions will “likely render the [scanning] receiver inoperable.” Proposed § 15.121(a)(2). The goal is to frustrate the efforts of “... parties with sufficient determination and technical expertise [who] have sometimes found ways to perform... modifications [to scanners designed to comply with current § 15.121].” NPRM at para. 1. In addition to the legal infirmities and technical realities Yaesu has already discussed, there are several problems here.

39. First, the language is fatally vague. What is “likely” to render a scanning receiver inoperable? What tuning and control circuits must be rendered inaccessible? Scanning receivers contain a large number of tuned circuits, all the way from the antenna input jack up to the detector. One who wants to try to modify and optimize a scanning receiver for Cellular frequencies might want to alter the factory adjustments, but many of these must be accessible for alignment of the receiver for perfectly legitimate purposes (service and repair). Control circuits range from the main tuning knob or keypad to preselectors, i-f bandwidths, offset and volume controls. One who wants to modify a scanning receiver for optimal performance on Cellular bands may well want to substitute different components in such control circuits. As written, then, the rule would require the majority of the scanning receiver to be hermetically sealed, both on the component side and on the foil side of the printed-circuit boards (for one could always cut traces to isolate or bypass components) as well as the controls themselves.

40. Such a draconian measure would also render scanning receivers largely throwaway devices. The failure of a ten-cent resistor or diode within the entombed area could render completely useless a receiver or transceiver costing \$200 to \$600 or more. That is an unfair